children living in regions with lower incomes remained below average, probably because ART began significantly later in life. In addition, the cumulative incidence of mortality by age 15 was approximately 3 times greater in low-income countries than in high-income ones (2.6% and 0.9%, respectively).

This data set will no doubt improve our understanding of the population of young people living with HIV infection, in no small part owing to its impressive size and breadth. Previously, the only available data sets included many fewer children and adolescents, and were limited to regional or national cohorts. However, the work also comes with caveats. For instance, the cohorts studied in different parts of the world were established for different reasons — some were national registries, whereas others were groups followed as part of other research. As such, there could be some biases in the study. In addition, there were some differences in the data elements that were collected in different regions. Future studies looking at specific aspects of the data might therefore be limited to fewer adolescents.

The CIPHER investigators' work adds to previous evidence[4,5] for the benefits of early ART. Together, these key studies demonstrate that early ART can save lives and preserve normal growth and development in children with HIV infection. However, the scale-up of ART for infected children has lagged woefully behind that for adults. Data from the United Nations' children's agency Unicef (see go.nature.com/2qqc5gt) show improvements in the availability of ART for children under 15 years of age since 2005, but there is still much to be done. In 2015, fewer than half of infected children were receiving ART (Fig. 1).

There are many barriers to the optimal provision of ART for children in low-income countries[6]. For instance, problems with infrastructure, including a lack of medical personnel and insufficient drug stocks, are common in many areas of the world. Drug development is challenging, because the physiological changes that occur during childhood can affect drug absorption, distribution, metabolism and excretion, and much work is therefore typically required to make drugs safe and effective for children of all ages. ART consists of three drugs that, in adults, can be given in one pill — but this is trickier in children, because the appropriate ratios of the drugs might vary with age. Finally, infant- and child-friendly formulations that do not require refrigeration and are easy to transport are currently lacking.

"Early antiretroviral therapy can save lives and preserve normal growth and development in children with HIV infection."

Because advances in preventing perinatal HIV infection have markedly decreased the numbers of infected children, there is unfortunately no longer a market benefit to developing paediatric ART, making it an unattractive focus for pharmaceutical companies. The current paper's clear demonstration of the benefits of early ART demands that efforts to develop optimal drugs and formulations be increased. In addition, infrastructure must be put in place to make ART consistently available to the more than one million children with HIV infection who do not currently have adequate access to these live-saving drugs. ■

Patricia M. Flynn *is in the Department of Infectious Diseases, St Jude Children's Research Hospital, Memphis, Tennessee 38105, USA.*
e-mail: pat.flynn@stjude.org

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OCEAN SCIENCE

Shrimp cause a stir

Brine shrimp (*Artemia salina*) are a type of tiny crustacean that lives in swarms and has a daily pattern of vertical migration. In a paper online in *Nature*, Houghton *et al.* report that such group migration generates water eddies with the potential to cause substantial mixing of the water column (I. A. Houghton *et al. Nature* https://doi.org/10.1038/s41586-018-0044-z; 2018).

The ability of individuals or groups to alter their physical environment has long fascinated biologists. Indeed, Charles Darwin's final book, *The Formation of Vegetable Mould through the Action of Worms* (Murray, 1881), reported his analysis of the changes that could occur through the repeated actions of small creatures. This work was a fitting finale for a career spent showing how small changes could, given the time and opportunity, have large effects. As with worms, so, too, with shrimp.

In laboratory-conducted experiments, Houghton and colleagues studied the effect of *A. salina* group migration (pictured: a time-lapse image in which the vertical tracks made by suspended particles provide a way of monitoring water flow). They found that shrimp movement created a water jet that caused mixing of the water column on a scale three orders of magnitude more effective than the mixing that occurs by diffusion. Ocean mixing can be caused by wind or currents. Small marine organisms might also contribute to perceptible ocean-mixing changes, if the phenomenon reported by Houghton and colleagues is relevant for tiny crustaceans called krill, which swarm in vast numbers in climatically sensitive parts of the world, such as the Southern Ocean. **Henry Gee**

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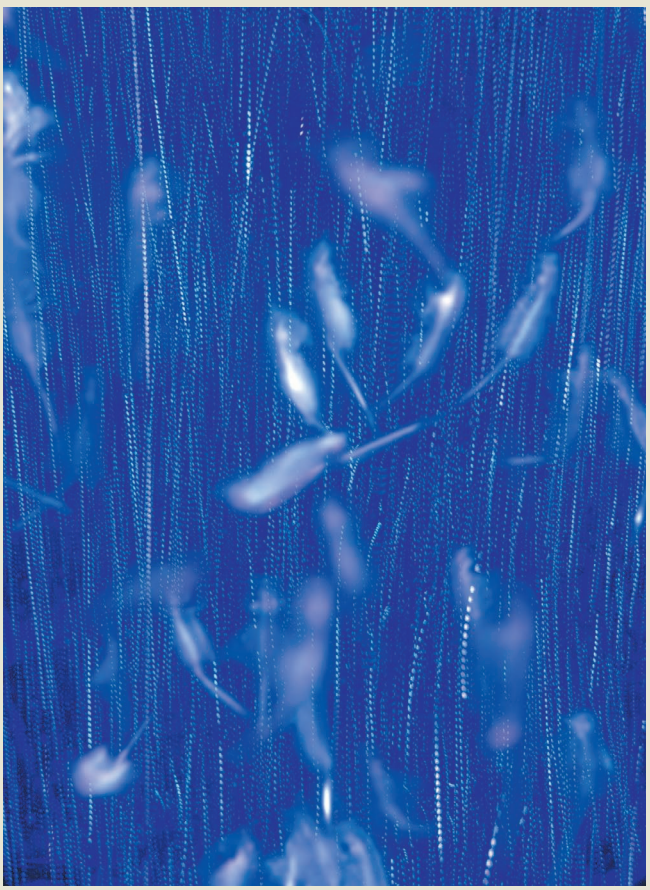

ISABEL HOUGHTON